AD-A182 748 TECHNICAL REPORTS PREPARED UNDER CONTRACT N00014-76-C-0475(U) STANFORD UNIV CA DEPT OF STATISTICS H SOLOMON 29 MAY 87 N00014-76-C-0475 1/1

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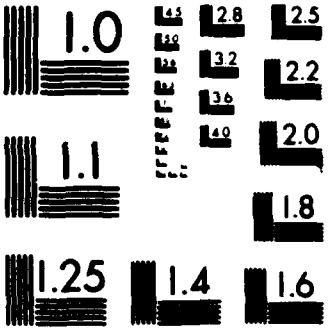

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STANFORD, CALIFORNIA 94305

DEPARTMENT OF STATISTICS
SEQUOIA HALL

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May 29, 1987

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Office of Naval Research
800 N. Quincy Street
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Attn: Mathematical Sciences Division

Re: Final Report N00014-76-C-0475

Dear Sirs:

This letter, the attached list of technical reports issued under the captioned contract, some discussion of the technical memoranda developed under the contract, and the listing of the workshops held under the contract constitute the final report for this contract. The list of technical reports issued in the contract period served by this report, May 1, 1976 to March 31, 1987, begins with Technical Report No. 233 dated July 1, 1976 and ends with Technical Report No. 388 dated March 17, 1987.

The titles of the 156 technical reports indicate the eclectic nature of the topics developed in applied statistics and applied probability and issued under the contract. In addition, over 75 technical memoranda were developed in response to technical queries from Defense Department agencies, principally the National Security Agency. A sample of twenty-five topics studied is attached.

Several workshops were undertaken jointly with the Navy Center for International Science and Technology, an Office of Naval Research unit located at the Navy Postgraduate School in Monterey. For each workshop a proceedings volume was prepared. The titles are attached.

The contract was terminated for administrative purposes. Previous reports through Technical Report No. 232 were submitted under prior contracts, and reports under the new contract N-00014-86-K-0156 will begin with No. 389.

We wish to thank the Office of Naval Research and other contributing Defense agencies for their support of this program in "Applied Statistics."

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Sincerely yours,

Herbert Solomon
Principal Investigator

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TECHNICAL REPORTS PREPARED UNDER CONTRACT N00014-76-C-0475 (NR-042-267)

May 1976 - March 1987

Technical Report No.	Title	Author	Date
233	On Combining Pseudorandom Number Generators	Mark Brown Herbert Solomon	7/15/76
234	Total Progeny in a Critical Age-Dependent Branching Process with Immigration	Howard Weiner	7/22/76
235	The Information in Contingency Tables--An Application of Information-Theoretic Concepts to the Analysis of Contingency Tables	C. T. Ireland S. Kullback	8/04/76
236	The Distribution of Cycle Lengths in a Class of Abstract Systems	Alan E. Gelfand Crayton C. Walker	8/11/76
237	Spearman's Footrule as a Measure of Disarray	Persi Diaconis	9/02/76
238	Discrimination, Allocatory and Separatory, Linear Aspects	Seymour Geisser	9/09/76
239	Multivariate Statistical Analysis As Applied to the Problems of Uncovering Volcanic Structures and the Evolution of Rift-Zone Volcanism	Edward Bloomstein	10/06/76
240	Asymptotic Probabilities in a Critical Age-Dependent Branching Process	Howard J. Weiner	12/03/76
241	Estimation of Parameters of Zero-One Processes by Interval Sampling: An Adaptive Strategy	M. Brown, H. Solomon and M.A. Stephens	2/28/77
242	Limit Probabilities in a Multi-Type Critical Age-Dependent Branching Process	Howard J. Weiner	3/07/77
243	Management Strategies in Fixed-Structure Models of Complex Organizations	Crayton Walker	3/14/77
244	Random Space Filling and Moments of Coverage in Geometrical Probability	Andrew Siegel	4/04/77
245	Distribution of a sum of weighted Chi-square variables	H. Solomon M. Stephens	6/02/77

Technical Report No.	Title	Author	Date
246	A study of renewal processes with IMRL and DFR Interarrival Times	M. Brown	6/07/77
247	Goodness-of-fit for the Extreme Value Distribution	M. Stephens	7/18/77
248	Random Arcs on the Circle	A.F. Siegel	7/26/77
249	Information Analysis of Linear Interactions in Contingency Tables	S. Kullback	8/15/77
250	Management Strategies in Fixed-Structure Models of Complex Organizations II	A. Gelfand C. Walker	9/02/77
251	Joint distributions for total progeny in a critical branching process	H. Weiner	9/23/77
252	On the Distribution of the Greatest Common Divisor	P. Diaconis	10/10/77
	Approximate Solutions for Certain Optimal Stopping Problems	A.J. Petkau	1/05/78
253	Application of Graphic Multivariate Data Techniques in the Policy Sciences	P. Wang	1/04/78
254	The Covariance Matrix of Normal Order Statistics	M. Stephens	2/21/78
255	Φ-Optimal Second Order Designs for Symmetric Regions	L. Pesotchinsky	2/28/78
256	Remarks on BIB Designs with Repeated Blocks	L. Pesotchinsky	4/03/78
257	Asymptotic Coverage Distributions on the Circle	A. Siegel	4/11/78
258	The extinction Probability in a Critical branching Process	H. Weiner	5/30/78
259	Testing for Periodicity in a Time Series	A. Siegel	6/05/78
260	On the Half-Sample Method for Goodness of Fit	M.A. Stephens	7/12/78
261	Toward Characterizing Boolean Transformations	A. Gelfand	8/23/78
262	Goodness of Fit Tests with Special Reference to Tests for Exponentiality	M.A. Stephens	9/18/78
263	Hammersley's Law for the Van Der Corput Sequence: An Instance of Probability Theory for Pseudo-Random Numbers	A. del Junco	10/09/78
264	Approximations to Densities in Geometric Probability	H. Solomon M.A. Stephens	10/27/78

Technical Report No.	Title	Author	Date
265	Sequential Random Packing in the Plane	H. Weiner	11/05/78
	A New Approach to Inference From Accelerated Life Tests	F. Proschan	12/04/78
266	Limit Probabilities for Critical AGE Dependent Branching Processes with Immigration	H. Weiner	1/15/79
267	On Testing the Equality of Two Proportions	D. Barengut J. Petkau	2/08/79
268	Bayes and Equivariant Estimators of the Variance of a Finite Population	H. Solomon	2/21/79
269	On an Optimal Stopping Problem of Gusein-Zade	A.Q. Frank S. Samuels	3/05/79
270	A Martingale Inequality for the Square and Maximal Functions	L.H.Y. Chen	3/15/79
271	Statistical Inference for Bounds of Random Variables	P. Cooke	4/03/79
272	Statistics as a Mathematical Discipline	D.V. Lindley	4/25/79
273	Catching Small Sets Under Flows	M.H. Ellis J.M. Steele	5/02/79
274	Variance Reduction in Monte Carlo Simulation	M. Brown H. Solomon M.A. Stephens	6/26/79
275	EDF Tests of Fit for the Logistic Distribution Based in the Empirical Distribution Function	M.A. Stephens	9/05/79
276	Optimal Linear Estimation of Bounds of Random Variables	P. Cooke	9/24/79
277	Minimax Stopping Rules when the Underlying Distribution is Uniform	S.M. Samuels	10/25/79
278	The Anderson-Darling Statistic	M. Stephens	10/30/79
279	Optimal Whereabouts Search for a Moving Target	J.B. Kadane L. Stone	11/15/79
280	Central Limit Theorem for Parking Models on the Line and Plane	H. Weiner	12/14/79
281	Optimal Strategies for Second Guessers	J.M. Steele J. Zidek	2/25/80
282	Detecting Change Points in Sampling from Multinomial Distributions	A. Gelfand	3/04/80

Technical Report No.	Title	Author	Date
283	On Convergence of the Coverage by Random Arcs on a Circle and the Largest Spacing	L. Holst	3/11/80
284	Further Percentage Points for Greenwoods Statistics	M.A. Stephens	4/23/80
285	Complete Convergence of Short Paths and Karp's Algorithm for the TSP	J.M. Steele	5/2/80
286	Applying Asymptotic Shapes to Nonexponential Families	G. Schwarz	5/22/80
287	Sizes of Order Statistical Events	D. Rudolph J.M. Steele	6/03/80
288	The Difference Between the Empirical Histogram & the Probability Histogram for Sums	P. Diaconis D. Freedman	7/02/80
289	Growth Rates of Moment Sequences	W. Harkness	7/30/80
290	The Von Mises Distribution in p-Dimensions with Applications	M.A. Stephens	8/04/80
291	An Approximation to the Distribution of the Sample Variance	M.A. Stephens	10/15/80
292	Multidimensional Infinitely Divisible Variables and Processes. Part I: Stable Case	R. LePage	10/23/80
293	Long Common Subsequences and the Proximity of Two Random Strings	J.M. Steele	11/06/80
294	Nearest Neighbor Classification of Stationary Time Series: An Application to Anesthesia Level Classification by EEG Analysis	W. Gersch	12/05/80
295	Exact Distributions for Gaps and Stretches	J. Deken	1/05/81
296	Covering the Circle with Random Arcs of Random Size	A.F. Siegel	1/29/81
297	Asymptotic Power of EDF Statistics for Exponentiality Against Weibull and Gamma Distributions	M.A. Stephens	2/04/81
298	Tables of Significance for the Variance-Weighted Kolmgorov-Smirnov Statistics	H. Niederhausen	2/19/81
299	The Classification and Mixture Maximum Likelihood Approaches to Cluster Analysis	G.J. McLachlan	3/12/81

Technical Report No.	Title	Author	Date
300	Large Deviation Probabilities for Certain Dependent Processes	K. Singh	3/27/81
301	Long Unimodal Subsequences: A Problem of F.R.K. Chung	J.M. Steele	4/02/81
302	Characterizations and Goodness of Fit Tests	M.A. Stephens F.J. O'Reilly	6/02/81
303	A Parametric Analysis of Structured and Unstructured Q-Sort Data	Wm. Heavlin	6/09/81
	Random Sequential Packing in Euclidean Spaces of Dimensions Three and Four and a Conjecture of Palasti	H. Solomon	7/27/81
305	On the Cyclic Behavior of Random Transformations on a Finite Set	A. Gelfand	8/04/81
306	Growth of the Maximum in a Critical Age-Dependent Branching Process	H. Weiner	9/15/81
307	Sequential Procedures for a Class of Distributions Related to the Uniform	P.J. Cooke M.K. Vagholkar	9/21/81
308	Choosing the Best of the Current Crop	S. Samuels G. Cambell	10/05/81
309	On the Accuracy of Simulated Percentage Points	J.M. Juritz J.W.F. Juritz M.A. Stephens	10/07/81
310	Optimal Sequential Selection of a Monotone Sequence from a Random Sample	J.M. Steele S.M. Samuels	11/10/81
311	On Tests for Uniformity: Neyman's Statistics and Statistics Based on Gaps and Stretches	H. Solomon	11/16/81
312	Factoring Probabilities on Compact Groups	P. Diaconis M. Shashahani	12/02/81
313	A Note on Non-Linear Functions of Linear Combinations	P. Diaconis M. Shashahani	2/02/82
314	Random Covering and Packing on the Line	H.J. Weiner	2/16/82
315	Updating Subjective Probability	P. Diaconis S.L. Zabell	3/02/82
316	On Asymmetric Stochastic Bang-Bang Control	H. Weiner	4/06/82
317	An Estimation Problem with Poisson Processes	A. Gelfand	4/20/82

Technical Report No.	Title	Author	Date
318	The Exact Distributions of Some Kolmogorov-Smirnov Type k-Sample Statistics	S.G. Mohanty B.R. Handa	5/06/82
319	Steinhaus' Geometric Location Problem for Random Samples in the Plane	J.M. Steele D. Hochbaum	5/11/82
320	Sequential Stochastic Construction of Random Polygons	E.I. George	6/10/82
321	A Robust Alternative to the Normal Distribution	D.L. McLeish	7/06/82
322	On the Evaluation of Certain Multivariate Normal Probabilities	S. Iyengar	8/12/82
323	EDF Statistics for Testing for the Gamma Distribution with Application to Testing for Equal Variances	M.A. Stephens	8/13/82
324	Kingman's Subadditive Ergodic Theorem	J.M. Steele	9/03/82
325	Distributed Wiener-Poisson Control	H. Weiner	9/16/82
326	The Moments and Distributions of Some Quantities Arising from Random Arcs on the Circle	F. Huffer	9/28/82
327	The Problem of Selecting a Given Number of Representative Points in a Normal Population and a Generalized Mills' Ratio	Kai-Tai Fang Shu-Dong He	10/04/82
328	A Mixing Distribution Approach to Estimating Particle Size Distributions	A. Kuk	10/19/82
329	Estimation In Noncentral Distributions	A.E. Gelfand	1/10/83
330	Selecting Representative Points In Normal Populations	S. Iyengar H. Solomon	1/14/83
331	Projection Pursuit Regression: Some Mathematics	P. Diaconis	4/07/83
332	Asymmetric Wiener Control	H. Weiner	4/12/83
333	On The Fitting Of Pearson Curves To Sums Of Independent Random Variables	T. Sellke	5/19/83
334	Further Examination Of Simulated Percentage Points	M.A. Stephens	6/15/83
335	Jury Size And Jury Verdicts	H. Solomon	6/28/83
336	Tests For Exponentiality When Origin and Scale Parameters Are Unknown	J. Spinelli M.A. Stephens	8/02/83

Technical Report No.	Title	Author	Date
337	The Amplitude Density Function And High-Resolution Frequency Analysis Of Time Series	A.J. Izenman	9/06/83
338	Wiener-Poisson Control Problems	H.J. Weiner	11/22/83
339	Some Alternatives to Bayes' Rule	P. Diaconis S. Zabell	11/29/83
340	Correlation Structure in Iterated Farlie-Gumbel-Morgenstern Distributions	J.S. Huang Samuel Kotz	01/10/84
341	Stationary Stochastic Asymmetric Control	H. Weiner	01/18/84
342	Approximations For Expected Values of Normal Order Statistics With An Application To Goodness-Of-Fit	N. Fotopoulos J. Leslie M. Stephens	03/06/84
343	Switching Net Models: Rudimentary Behavior, Representations And Applications	A.E. Gelfand	04/04/84
344	Asymmetric Wiener-Poisson Control	H. Weiner	05/24/84
345	Applications of Combinatorics to the Busy Period in Several Queueing Models	S.G. Mohanty J.L. Jain	06/05/84
346	Variability Orderings Related To Coverage Problems On The Circle	F. Huffer	06/12/84
347	Distribution Results For Positive Definite Quadratic Forms With Repeated Roots	M.E. Bock	07/10/84
348	Efficient Scores, Variance Decompositions And Monte Carlo Swindles	Iain Johnstone Paul Velleman	08/28/84
349	Log Linear Model Applications	Herbert Solomon	08/30/84
350	W.E. Johnson's "Sufficientness" Postulate	Sandy L. Zabell	11/22/84
351	Inequalities For the M/G/∞ Queue And Related Shot Noise Processes	Fred Huffer	11/29/84
352	Tests Of Fit Based On Normalized Spacings	R.A. Lockhart F.J. O'Reilly M.A. Stephens	12/27/84
353	A Collection of Probability Distributions	C.S. Davis M.A. Stephens	02/27/85
354	Fixed Width Interval Estimation In Linear Regression	Anthony Y.C. Kuk	03/07/85
355	Tables For Distributions Of Quadratic Forms	Mary Ellen Bock Herbert Solomon	03/21/85

Technical Report No.	Title	Author	Date
356	Decomposing The Joint Distribution Of Several Linear Combinations Of Uniform Spacings	Fred Huffer	04-25-85
357	A Simulation Study Of Sylvester's Problem In Three Dimensions	Kim-Anh Do Herbert Solomon	05-02-85
358	Model Robust Response Surface Designs: Scaling Two-Level Factorials	David Steinberg	06-06-85
359	A Behavioral Summary For Completely Random Nets	Alan E. Gelfand	06-20-85
360	Random Sequential Coding By Hamming Distance	Yoshiaki Itoh Herbert Solomon	07-11-85
361	Transforming Censored Samples And Testing Fit	F. J. O'Reilly M. A. Stephens	07-23-85
362	How Many Bootstraps?	Robert Tibshirani	08-22-85
363	The Indexing Properties Of An Ancillary Statistic	Anthony Y.C. Kuk	08-28-85
364	Assessing System Reliability Using Censoring Methodology	Doss, Hani Freitag, Steven Proschan, Frank	09-12-85
365	On Improving Simultaneous Confidence Regions For Time Series Analysis	Alan J. Izenman Sanat K. Sarkar	10-10-85
366	Inference For An Experiment Based On Repeated Majority Votes	Jessica Utts	10-15-85
367	Estimates Of Circular Error Probabilities	M. Evans Z. Govindarajulu J. Barthoulot	12-05-85
368	Convexity Of Elliptically Contoured Distributions With Applications	S. Iyengar Y.L. Tong	12-10-85
369	Tests For The Extreme Value And Weibull Distributions Based On Normalized Spacings	R.A. Lockhart F. O'Reilly M.A. Stephens	12-19-85
370	All Subsets Regression In Cox Model	Anthony Y.C. Kuk	03-04-86
371	A Note On Estimating The Improvement In Stein-Type Estimators	Alan E. Gelfand	04-10-86
372	On The Probability Of Covering The Circle By Random Arcs	F.W. Huffer L.A. Shepp	04-17-86

Technical Report No.	Title	Author	Date
373	Survey Of Soviet Work In Reliability	A.L. Rukhin	04-29-86
374	On The Use Of Ridge And Stein-Type Estimators In Prediction	Alan E. Gelfand	05-21-86
375	Bootstrap Confidence Intervals And Bootstrap Approximations	Thomas DiCiccio Robert Tibshirani	06-04-86
376	A Unified Approach To Constructing Nonparametric Rank Tests	Douglas E. Critchlow	07-06-86
377	On The Relation Between Several Statistics For Testing For Exponentiality And Uniformity	Iain D. Currie Michael A. Stephens	07-15-86
378	Slepian's Inequality Via The Central Limit Theorem	Fred W. Huffer	08-05-86
379	Inequalities For Linear Combinations Of Gamma Random Variables	M.E. Bock P. Diaconis F. Huffer	09-02-86
380	A Survey Of Statistical Methods Appearing In The Current Russian Literature On Remote Sensing	Joseph Glaz	10-06-86
381	A Program For Estimating Uncertainties In Quantile Estimates Derived From Empirical Pearson Fits	Iain Johnstone	10-14-86
382	Quantiles Of Kaplan-Meier Estimator	Hani Doss Steven Freitag	11-04-86
383	A Review Of The Packing Problem	Herbert Solomon Howard Weiner	11-12-86
384	Nearest Neighbor Rule Classification Of Time Series In Exploratory Population Screening Problems	Will Gersch	12-09-86
385	Sampling Random Polygons	Edward I. George	12-29-86
386	Monte Carlo Computation Of Some Multivariate Normal Probabilities	M. Evans T. Swartz	01-14-87
387	Modeling Multivariate Covariance Nonstationary Time Series And Their Dependency Structure: An Application To Human Epileptic Event EEG Analysis	Will Gersch	01-21-87
388	A Simulation Study Of Random Caps On A Sphere	H, Solomon C, Sutton	03-17-87

A Selection of 25 Defense Department Questions Proposed
Leading to Technical Memoranda

1. Tail area estimation using moments
2. Non-parametric tail area estimation
3. Tail area estimation using both moments and samples
4. Pearson curve fitting vs. alternative methods
5. Distribution of the ratio of functions of normal random variables
6. Pearson fit to the exceedance statistics
7. Distribution of the sum of non-identical, non-independent two point random variables
8. Clustering vectors with missing components
9. Best algorithm for generating standard normal variables
10. Distribution of censored sums
11. Mixed discrete and continuous discriminant analyses
12. Utility of higher moments
13. Dimensionality reduction
14. Replacing a value by its remainder
15. Moments of the exceedance statistics
16. Approximations of the mean of the largest order statistic in a sample from a normal distribution
17. Approximations to the distributions of normal order statistics
18. Theories of combining evidence
19. Estimation of very small tail area probabilities
20. Distribution of a linear combination of multinomial random variables for small sample sizes

21. Tests for independence between multivariate vectors that are identically distributed

22. Distribution of the largest common subsequence

23. Probability that k out of p dependent normal random variables are all greater than some constant

24. Distribution of the difference between a normal and a log gamma random variable

25. Distribution of the largest eigenvalue

Proceedings of Conferences and Workshops

1. Science and Technology in the Soviet Union: Proceedings of a Conference, July 26, 27, 1984; Stanford University. Issued January 31, 1985.

2. Database Management: Proceedings of a Conference, November 1, 2, 1984; Navy Postgraduate School, Monterey. Issued July 31, 1985.

3. Workshop on Assessing Uncertainty, November 13, 14, 1986; Navy Postgraduate School, Monterey. Issued March 16, 1987.

END

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